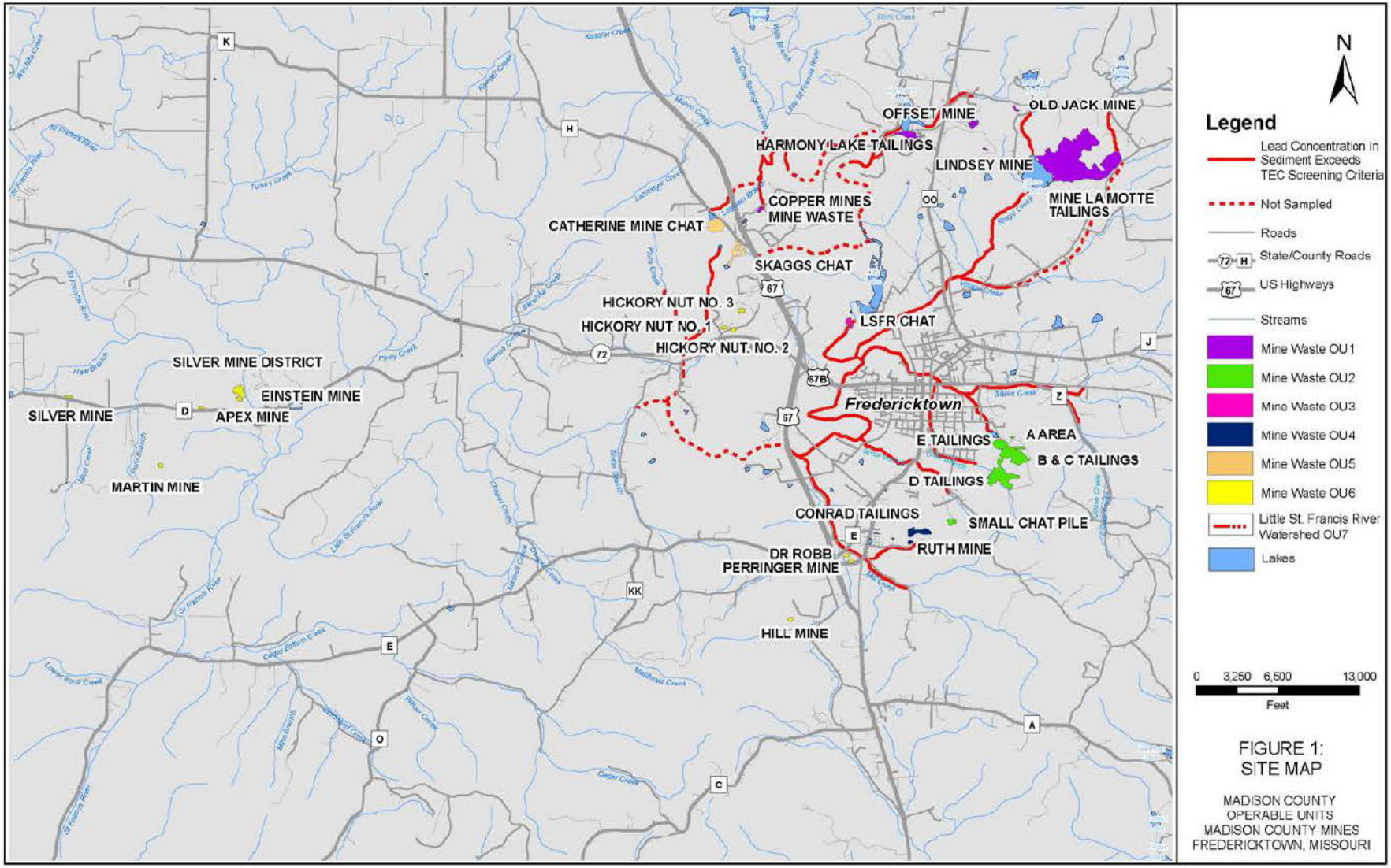
Madison County Mines Site
OU3 Residential Soils
OU4 Conrad Tailings
Fredericktown, Missouri

Madison County Mines Site Plat



OU4 Conrad Tailings Setting

Site History and Characteristics

- Madison County is located in the Old Lead Belt in SE Missouri and is believed to be the first county mined west of the Mississippi River beginning in the early 1700's and continuing thru mid 1900's.
- Approximately 850 acres of tailings is present across the Site totalling an estimated 15 million cubic yards of mine waste at 13 major locations.
- OU4 Conrad Tailings is one of the 13 known mine waste piles in Madison County.
- The impoundment covers approximately 28 acres in size and estimated at 283,000 cubic yards of tailings.

Site History and Characteristics (cont'd)

- Site studies across the county were initiated by the State of Missouri in 1980. First Superfund study was conducted in 1995.
- Blood-lead testing in children began shortly thereafter and monitoring revealed approximately 15% of the targeted child population possessing elevated blood-lead.
- Removal assessments for residential properties began in 2000 and approximately 42% of all properties sampled possess elevated concentrations of lead and co-located COC's.
- Mine waste and contaminated soil was transported to residential properties throughout the entire project area for use in driveways, construction base, property grading and topsoil.

Residential Cleanup Progress and Status

- Soil sampling has been conducted at over 4200 residences since sampling began in 2000.
- Removal Actions beginning in 2001 included time critical concentration >1200 ppm lead and concentrations >800 ppm resulted in the remediation of 813 residential properties through 2006.
- Remedial actions beginning in 2008 addressing residential properties >400 ppm lead.
- 880 residential properties have been remediated through 2012.
- Approximately 550 residential properties remain to be sampled. 300 are estimated to require cleanup.

Risks to Human Population Exposed

- Direct exposure to lead contaminated surface soil on residential properties remains.
- Observed elevated blood lead levels in children due to lead contaminated has been reduced but still persists (+/- 2%)
- Elevated concentrations in soil will cause an EBL level in a child (IEUBK)
  - Site specific IEUBK model gave P10 > 5% at soil concentration of 400 ppm
- Lead contamination risk exists due to lead in dust from track-in and wind erosion.

Site Containment Stability

- The tailings piles are extremely unstable and heavily eroded and allows downstream impacts to surface water, sediment and soil along river and creek channels.
- The impact to stream systems is ongoing without properly engineered grading, drainage systems and structures to collect suspended sediment in runoff water and tailings.
- Lead in yard soil is available to children on toys and hand to mouth behavior.
- Lead is mobilized through track-in by residents and pets; wind borne dust through windows adds additional dust exposure.
- Lack of enforcement at State and local levels for use of mine waste for construction purposes at residences.

Conrad Tailings Erosional Features

Contaminant Characteristics

- Lead is primary COC in residential soils and in tailings
  - Arsenic, cadmium, cobalt, nickel and zinc exist as COCs but their collocated presence is "screened out" upon lead being remediated to meet its PRG of 400 ppm.
  - Approximately 58% of all residences exceed the 400 ppm PRG and children have greater than a 5 percent chance of exceeding a blood lead level of 10 ug/dl
  - Elevated blood-lead in children is associated with adverse health outcomes such as neurological damage.
- Lead bioavailability is at or above IEUBK default value
- Biodegradation of lead does not occur
- Lead adheres to soil particles

Threat to Sensitive Environments

- Health risks exist to residents due to the potential exposure of lead at their homes across the entire site from transported mine waste and soils that were used for construction, grading and topsoil by ingestion and inhalation.

- Aquatic and terrestrial ecosystems are impacted by exposure to mine waste contaminants at nearly every location where uncontrolled runoff is occurring.

OU3 Selected Remedy (Discrete Funding Activities)

- 2008 OU3-Residential Properties IROD Remedy
  - Clean up +/- 1,100 residential properties

    If soil tests 400 ppm or less, remove contaminated soil to a depth of 12"; If soil tests 1,200 ppm or higher, remove contaminated soil to a depth of 24" and install an orange warning barrier.
  - Replace excavated soil with clean fill, topsoil, and hydro-seed (or sod in some cases)
  - Property is returned to original elevation and grade
  - Establish IC components that include Health Education, and Voluntary Institutional Control Pilot Project

*Final ROD will evaluate the ICs and designate O&M

OU4 Selected Remedy – Discrete Funding Activities

- 2011 OU4 Conrad Tailings ROD Remedy:
  - Remove eroded tailings, impacted soil, and sediment at downstream locations including residential properties.
  - Construction of semi-permeability cap and establish vegetative cover over tailings impoundment.
  - Construction of basins to capture surface runoff and groundwater seeps for treatment.
  - Utilize existing wetlands and construct new wetlands as needed for controlling runoff and treating seeps that may discharge from the repository.

OU4 Selected Remedy – Discrete Funding (cont'd)

- Install monitor wells at and down-gradient of the repository.
- Monitor surface water in creek to ensure the PRGs are met and groundwater to ensure migration is not occurring outside the repository boundary.
- Establish environmental covenants through the State of Missouri Environmental Covenants Act with property owners as institutional controls to prevent activities that would damage the constructed engineering components and result in exposure risks.
- O&M will be provided by State of Missouri

Program Considerations

- Funding the remaining +/- 300 OU3 residential properties will facilitate construction completion of the greatest risk to human health at the Site.

- The necessity to properly address the location where the residential soils are disposed of is a commitment EPA accepted when the decision to use the OU4 Conrad Tailings as the site repository was made.

Program Considerations

- Completing OU3 residential cleanup action without initiating and completing action at the OU4 repository will result in:

  -Continued erosion of both tailings and the residential soils placed for disposal

  -Damage to the integrity of the temporary structures placed to contain the tailings and soil

  -Continued migration of contamination to downstream locations, and...

  -**COSTLY MAINTENANCE**

Exemption 5: DP

Funding Plan (cont'd)

- Requested Program Funds:

Exemption 5: DP

State SSC provides a 10% cost share for the RA expenditures

QUESTIONS?

Contact Information

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